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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/912,315 | 07/26/2001 | Hideo Kobayashi | 110207 | 4956 |
| 25944 | 7590 | 06/01/2005 | EXAMINER | |
| OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320 | | | NGUYEN, KEVIN M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2674 | |

DATE MAILED: 06/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/912,315

Applicant(s)

KOBAYASHI ET AL.

Examiner

Kevin M. Nguyen

Art Unit

2674

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3,4,17 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3,4,17 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 22, 2005 has been entered. An action on the RCE follows:
2. This office action is made in response to applicant's amendment filed on April 22, 2005. Claims 1, 2 and 5-16 are cancelled, claims 19-30 are not entered, claims 3, 4, 17 and 18 are amended, and claims 3, 4, 17 and 18 are currently pending in the application. An action follows below:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 3, 4, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (previously cited) in view of Marlor (newly cited, US 5,153,761).
4. As to claim 3, Tanaka teaches an apparatus associated with a method, the apparatus comprising:

Ferroelectric liquid crystals layer FLC 903 (a display element, fig. 9), a photoconductive layer 902 (an optical switching element, fig. 9).

[recited in lines 6-8 of claim 3]

Fig. 10 shows current-voltage characteristics 1002 and 1001 with and without light irradiation (col. 14, lines 24-25).

[recited in lines 8-9 of claim 3]

The photoconductive layer 902 has the diode characteristics, so that the photoconductive layer 902 is in a low-resistance state during the application of forward bias voltage, and is in a high-resistance state during the application of reverse bias voltage (fig. 9, col. 14, lines 12-22).

The applied driving voltage is greater than the 0.7 volts (a threshold voltage of the diode); therefore, the display element 903 is turned on.

The low-resistance state during the application of forward bias voltage, and a high-resistance state during the application of reverse bias voltage" defined a ratio of the resistance being controlled at least depending on a direction of an applied bias voltage.

[recited in lines 9-13 of claim 3]

The photoconductive layer 902 becomes into the forward-biased state, and the FLC layer 903 becomes into the OFF state (corresponding to the A point in Fig. 12, $P=P_s$). In this case, the applied voltage V_f to the FLC layer 903 is obtained by the following equation, as indicated by the broken line, $V_f=V_e-V_d$. The applied charge Q is obtained by $Q=C_f(V_e-V_d)+P_s (>Q_1)$ (col. 16, lines 7-13).

Thus, "the applied charge Q is obtained by $Q = C_f(V_e - V_d) + P_s (> Q_1)$ " defined an electrical charge amount of the display element. "The FLC layer 903 becomes into the OFF state" defined turning off the voltage applied to the recording medium.

Accordingly, Tanaka teaches all of the claimed limitation of claim 3, except for "a ratio of the resistance component is controlled by flowing charges generated by the charge generating layer through the charge transport layer, the display is turned off by applying a residual voltage, the residual voltage corresponding to the electrical charge amount and being effectively smaller than the threshold voltage."

However, Marlor teaches a related light valve (optical switching) comprising the photoconductive structure 43 (fig. 4) including a ratio of an impedance of a capacitor C_7 (fig. 5) of a charge separation (transport) layer 46 (fig. 5) to an impedance of a resistor R_7 of the charge generation layer 47 (fig. 5, col. 13, lines 3-10).

A voltage applies to a capacitor 32a (C_1) (fig. 7) of the liquid crystal display is dropped (col. 12, lines 3-5). The polarity of the AC voltage V determines which of the diodes 50 or 51 is not conducting (col. 12, lines 10-12). Thus, it would have been obvious to provide the display is turned off by applying a residual voltage, the residual voltage corresponding to the electrical charge amount and being effectively smaller than the threshold voltage.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to substitute the photoconductive layer 902 in Tanaka et al with the photoconductive structure 43 (fig. 4) including the ratio of an impedance of a capacitor C_7 (fig. 5) of a charge separation (transport) layer 46 (fig. 5) to an impedance

Art Unit: 2674

of a resistor R7 of the charge generation layer 47, and substitute the liquid crystal display 903 in Tanaka et al with the liquid crystal 32a (fig. 7) including the capacitor C1 (fig. 7) discharge of the residual voltage corresponding to the electrical charge amount, in view of the teaching in Marlor's reference, because this would obtained by improvement on these parameters. The four parameters are (1) a long time delay between the generation of positive and negative free carriers and their recombination; (2) the availability of an electric field to move the charges; (3) a long drift path; and (4) a high drift mobility as taught by Marlor (see col. 3, lines 40-45).

Moreover, where the claimed differences involve substitution of interchangeable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem such substitution has been judicially determined to have been obvious. See In re Ruff, 118 USPQ 343 (CCPA 1958).

5. As to claim 17, referring to the rejection of claim 3 above.

6. As to claim 4, Nanaka et al teaches an apparatus associated with a method, the apparatus comprising:

[recited in line 6-8 of claim 4]

Fig. 10 shows current-voltage characteristics 1002 and 1001 with and without light irradiation (col. 14, lines 24-25). Thus, during without light irradiation corresponding to reverse bias voltage of the diode. There is no voltage applied to the FLC 903, so that the applied driving voltage is smaller than the 0.7 volts (a threshold voltage of the diode); therefore, the display element 903 is turned off.

[recited in lines 9-12 of claim 4]

Tanaka further teaches "the applied charge Q is obtained by $Q=C_f(V_e-V_d)+P_s(>Q_1)$ " (col. 16, lines 12-13) that defined controlling an electrical charge amount of the display element. In forward bias voltage, the applied driving voltage is greater than the 0.7 volts (a threshold voltage of the diode) to turn on the display element 903.

"The low-resistance state during the application of forward bias voltage" defined the decrease the resistance component of the optical switching element 902.

Accordingly, Tanaka teaches all of the claimed limitation of claim 4, except for "a ratio of the resistance component is controlled by flowing charges generated by the charge generating layer through the charge transport layer, the display is turned off by applying a residual voltage, the decrease of the residual voltage corresponding to the electrical charge amount."

However, Marlor teaches a related light valve (optical switching) comprising the photoconductive structure 43 (fig. 4) including a ratio of an impedance of a capacitor C_7 (fig. 5) of a charge separation (transport) layer 46 (fig. 5) to an impedance of a resistor R_7 of the charge generation layer 47 (fig. 5, col. 13, lines 3-10).

A voltage applies to a capacitor 32a (C_1) (fig. 7) of the liquid crystal display is dropped (col. 12, lines 3-5). The polarity of the AC voltage V determines which of the diodes 50 or 51 is not conducting (col. 12, lines 10-12). Thus, it would have been obvious to decrease of the residual voltage corresponding to the electrical charge amount.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to substitute the photoconductive layer 902 in Tanaka et al with

Art Unit: 2674

the photoconductive structure 43 (fig. 4) including the ratio of an impedance of a capacitor C7 (fig. 5) of a charge separation (transport) layer 46 (fig. 5) to an impedance of a resistor R7 of the charge generation layer 47, and substitute the liquid crystal display 903 in Tanaka et al with the liquid crystal 32a (fig. 7) including the capacitor C1 (fig. 7) discharge of the residual voltage corresponding to the electrical charge amount, in view of the teaching in Marlor's reference, because this would be obtained by improvement on these parameters. The four parameters are (1) a long time delay between the generation of positive and negative free carriers and their recombination; (2) the availability of an electric field to move the charges; (3) a long drift path; and (4) a high drift mobility as taught by Marlor (see col. 3, lines 40-45).

Moreover, where the claimed differences involve substitution of interchangeable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem such substitution has been judicially determined to have been obvious. See In re Ruff, 118 USPQ 343 (CCPA 1958).

7. As to claim 18, referring to the rejection of claim 4 above.

Response to Arguments

8. Applicant's arguments filed April 22, 2005 have been fully considered but they are not persuasive.

9. Applicant argues features in the independent claims 2, 3, 17, 18 that are newly recited. Thus, new grounds of rejection have been used. See paragraphs 4-7 above.

Conclusion


10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Nguyen whose telephone number is 571-272-7697. The examiner can normally be reached on MON-THU from 8:00-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick N. Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the Patent Application Information Retrieval system, see <http://portal.uspto.gov/external/portal/pair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin M. Nguyen
Patent Examiner
Art Unit 2674

KMN
May 25, 2005


XIAO WU
PRIMARY EXAMINER